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CANADA THISTLE

Gerald Miller and Richard Behrens

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CONTROLLING CANADA THISTLE

(*CIRSIUM ARVENSE* Scop.)

Canada thistle is a troublesome perennial broad-leaved weed infesting about 1.5 million acres of Minnesota land. It grows in cultivated fields, hay fields, pastures, lawns, gardens, industrial sites, rights-of-way, parks, forests, and wastelands. Because it grows vigorously, has an extensive underground root system, and produces many seeds that are widely scattered, Canada thistle is difficult to control.

Canada thistle grows 1 to 4 feet tall. Stems are slightly grooved and hairy. Canada thistle leaves are dark green with a grayish green undersurface. Leaf margins are usually deeply ruffled and lobed with numerous spines. However, leaf characteristics are variable and some plants have essentially smooth leaf margins.

Canada thistle persists because its root system overwinters and gives rise to new shoots in the spring. Roots have been found to a depth of 10 or more feet. They may grow 12 to 15 feet laterally in a year, often resulting in the formation of dense circular patches. New shoots may arise from buds well below the plow layer, so this weed is not easily eliminated by tillage.

Flowers develop in groups at ends of the top branches. The topmost flowers open first, then blooming proceeds down the stalk. Flowers are about three-fourths inch in diameter. They are mostly purple but may vary in color from white through various shades of pink to purple. The flowers are dioecious; that is, male and female flowers occur on different plants.

Seeds are dark brown and about one-eighth to three-sixteenths inch long. One main stem on a plant may produce a thousand or more seeds. If plants are cut 8 to 10 days after flowers open, the seed will already be mature enough to germinate. A tuft of hair attached to each seed enables the wind to carry it for many miles. Seeds are also spread by water, animals, and machinery, and contaminated grain, feed, hay, straw, and seed. Seeds will germinate after being buried in the soil for many years, so you must control seedlings long after the established plants have been eliminated.

Crop yields are reduced because Canada thistle competes for light, water, and nutrients. Studies show that yield reductions can be quite serious. For example, stands of 2, 12, and 25 thistles per square yard caused losses in small grain yields averaging 16, 36, and 60 percent.

CONTROL PRACTICES

An effective Canada thistle control program should: (1) prevent seed production, (2) kill the underground parts, and (3) prevent reinfestation by seedlings.

Use chemical treatment, tillage, or both for thistle control. The specific control practices you use depend on the degree of infestation and how the infested area is used. Although our main purpose is to discuss methods for control of Canada thistle in cropland, the methods suggested are suitable for most noncrop areas also.

Cropland infestations are usually of two types: (1) small thistle patches limited in size but sometimes with a very dense stand or (2) light to moderate infestations over large areas.

CONTROL OF PATCHES

Elimination of small, dense thistle patches is the most important part of a control program. These heavy stands are major sources of seed and rootstocks for the development of new infestations. The best control methods for dense patches require the loss of crop production for 1 or more years. This loss is not as serious as it may seem, however, because crop production is poor in dense thistle stands.

Several effective chemicals can be used for patch treatment. They are nonselective and kill some crops as well as thistles; residues of all chemicals except amitrole remain for 1 or more years. These chemicals usually eliminate 95 to 100 percent of the thistle stand at a cost of 14 to 87 cents per square rod. Refer to table 1 for specific chemicals.

TABLE 1.
Nonselective herbicides for Canada thistle control

Chemical*	Pounds per acre of active ingredient or acid equivalent broadcast	Approximate cost	
		Per acre	Per square rod
Amitrole	4	$23	14¢
Picloram	2	40	25
2,3,6-TBA	15	45	28
Dicamba	8	60	38
TBP-2,4-D	15	75	47
Fenac	15	82	52
Sodium chlorate	800	140	87

*See table 3.

Amitrole can be used on small dense patches of thistles with loss of crop only during the year of treatment. It is somewhat less consistent than the other chemicals listed in table 1; some strains of Canada thistle appear to be resistant to this compound. When sprayed on Canada thistle in the bud stage at 4 pounds per acre in high spray volumes of 40 to 60 gallons per acre, amitrole usually reduces thistle stands about 90 percent. If applied in the spring prior to the bud stage, root kill may be slight. Amitrole applied in the fall when thistle regrowth is about 8 inches tall has given effective control in some trials. Crops cannot be planted for 8 months after treatment because of possible residues.

Tillage can be used to eliminate Canada thistle. Killing the root system by exposure to drying or freezing at the soil surface is not very effective in eliminating Canada thistle because much of the root system is below the plow layer where it cannot be reached by tillage operations. Therefore, repeated destruction of top growth by tillage is used to kill the plants by depleting the food stored in the roots. To continually reduce the food supply, destroy top growth whenever it reaches a height of 2 to 3 inches. At least one and possibly two growing seasons of tillage are required to eradicate thistle patches by this starvation process. Plows and field cultivators with sweep shovels are best suited for tillage operations; disks are considerably less effective.

Chemical control is more desirable than tillage. Repeated tillage increases the possibility of erosion on land where erosion is a problem. And completion of tillage at the proper time may be difficult when the weather is adverse or other farm work is pressing. Once plants reach a height of 2 to 3 inches, a few additional days of undisturbed growth allow the thistles to rapidly replenish depleted food reserves in their roots. This additional regrowth extends the tillage period required to eliminate the thistles.

Mowing may prevent seed production by Canada thistle. But mowing is not as effective as tillage or herbicides for eliminating thistle patches.

Once a thistle patch has been eliminated, thistle seedlings must be controlled for many years to prevent the establishment of a new infestation. Seedlings can be readily controlled with 2,4-D.

CONTROL OF LARGE INFESTATIONS

When large acreages are infested with Canada thistle, it is seldom economically feasible for a farmer to stop crop production for one or more growing seasons while he eliminates the infestation. Furthermore, with chemical costs ranging from $20 to $140 per acre, the use of nonselective chemicals would be too expensive.

Farmers with thistle-infested fields diverted from crop production under the feed grain or cropland adjustment programs have an excellent chance to eliminate thistles while their land is out of crop production. Tillage methods can be used economically and effectively for thistle control in diverted fields. But the county ASCS committee's approval should be obtained before undertaking thistle control on land removed from production in government programs.

Several chemical practices allow crop production and still substantially reduce Canada thistle stands (table 2). In corn or small grains the growth and seed production of thistles can be suppressed by treatment with 2,4-D or MCPA. A combination of MCPA and dicamba is approved for use in small grains except spring barley. This combination gives greater Canada thistle suppression than MCPA or 2,4-D

TABLE 2. Chemicals for Canada thistle control in crops

CROP	CHEMICAL*	Pounds per acre of active ingredient or acid equivalent broadcast	TIME TO APPLY	REMARKS
Wheat or barley	2,4-D amine or 2,4-D ester	½ to ⅔ ¼ to ½	Fifth leaf to early boot Fifth leaf to early boot	Amine less injurious to crop
Wheat or oats	dicamba plus MCPA amine	⅛ + ¼	Two to five-leaf stage of crop	Kills legumes
Oats	2,4-D amine MCPA amine	½ ½	Sixth leaf to early boot	MCPA less injurious to crop
Corn	2,4-D amine 2,4-D ester 2,4-D amine 2,4-D ester dicamba	¼ to ½ ⅙ to ⅓ ½ to 1 ⅓ to ⅔ ⅛ to ¼	After two-leaf stage of corn to layby After layby Postemergence before corn is 36 inches tall	Use drop nozzles after corn is 8 inches tall
Grain sorghum	2,4-D amine	½	When sorghum is 4 to 12 inches tall	
Grass pastures	2,4-D amine or ester	1 to 2	Early bud stage of thistles	Do not graze dairy cattle for 7 days

*See table 3.

alone. Dicamba can also be used to suppress Canada thistle in corn.

Following herbicide application in the crops, after-harvest treatments are essential to reduce Canada thistle stands. After-harvest treatments include tillage or spraying thistle regrowth with 2,4-D. Rates of ¾ to 1 pound per acre of 2,4-D are effective in fall treatments. If fall plowing or tillage is to be done, delay until at least 2 weeks after treatment. When corn is grown, the late fall harvest prevents the use of an after-harvest treatment. So application of ¾ to 1 pound per acre of 2,4-D ester to the corn after layby may be used instead to reduce the thistle stand.

It is not desirable to grow soybeans in Canada thistle infested fields because chemicals cannot be used in soybeans for thistle suppression. If soybeans must be grown, spray with 1 pound per acre of 2,4-D when thistles are a few inches tall and at least 2 weeks before planting soybeans. Delay seedbed preparation and planting of soybeans at least 2 weeks after spraying to allow time for 2,4-D to act and to avoid 2,4-D residue effects on the soybeans.

One of the best cropping practices for the control of Canada thistle is to establish a good stand of alfalfa, bromegrass, or a mixture of alfalfa and bromegrass in thistle infested fields. These crops often eliminate Canada thistle if the crop is cut for hay at the proper time for 2 to 3 years.

In grass pastures, Canada thistle can be controlled with one to two spray applications per year of 2,4-D at 1 to 2 pounds per acre when thistles are growing rapidly and before the bud stage. Repeated treatment for 2 or more years is usually necessary. Do not graze dairy cattle for 7 days after treatment.

SAFETY PRECAUTIONS

Always follow carefully the precautions on the herbicide label. Use herbicides only on crops for which they are specifically approved and recommended. Use only recommended amounts; applying too much of an herbicide may damage the crop, may be unsafe if the crop is to be used for food or feed, and is costly. Apply herbicides only at times specified on the label; observe the recommended intervals between treatments and pasturing or harvesting of crops. Guard against possible injury to nearby susceptible plants. Follow the handling precautions given on the label.

For further information on weed control, see Extension Folder 212, Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55101. Your county extension office has copies.

TABLE 3. Herbicide names

Common name	Trade name*
amitrole	Amino-Triazole, Amizol, Weedazol
amitrole combined with ammonium thiocyanate	Amitrol-T, Cytrol
2,4-D	(Several trade names)
dicamba	Banvel-D
fenac	Fenac
MCPA	(Several trade names)
picloram	Tordon 22K
sodium chlorate	(Several trade names)
TBA	Benzac 1281, Trysben 200
TBA-borate mixtures	Amoco Noxious Weed Killer, Benzabor, TBA-Borate Granules
TBP-2,4-D mixtures	Amoco Noxious Weed Killer D, TBP Liquid Weed Killer, Tritac-D

*Trade names are listed only to aid the reader in identifying herbicides. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

Gerald Miller is assistant professor and extension agronomist;
Richard Behrens is a professor in the Department of Agronomy and Plant Genetics.

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